

**Sahelian West Africa:
Impact of Structural Adjustment Programs on Agricultural
Competitiveness and Regional Trade**

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Abdoul W. Barry, B. Lynn Salinger and Selina Pandolfi
Associates for International Resources and Development

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For information contact:

Yoon Lee, Project Officer
USAID
AFR/SD/SA (4.06-115)
Washington, D.C. 20523
Tel: 202-712-4281 Fax: 202-216-3373
E-mail: ylee@usaid.gov

Lisa M. Matt, Senior Advisor
BHM International
P.O. Box 3415
Alexandria, VA 22302
Tel: 703-299-0650 Fax: 703-299-0651
E-mail: lmatt@eagerproject.com
Contract AOT-0546-Q-00-5271-00

J. Dirck Stryker, Chief of Party
Associates for International
Resources and Development (AIRD)
185 Alewife Brook Parkway
Cambridge, MA 02138
Tel: 617-864-7770 Fax: 617-864-5386
E-mail: dstryker@aird.com
Contract AOT-0546-A-00-5073-00

Sarah Van Norden, Project Administrator
Belfer Center for Science & International Affairs
John F. Kennedy School of Government
79 John F. Kennedy Street
Cambridge, MA 02138 USA
Phone: 617-496-0112 Fax: 617-496-2911
E-mail: sarah_van_norden@harvard.edu
Contract AOT-0546-A-00-5133-00

Abstract

The object of this study is to contribute to the debate on regional trade of agricultural products. The study focuses on a group of countries that includes Burkina Faso, Côte d'Ivoire, Ghana, Guinea-Conakry, Mali, and Senegal and discusses the extent that Structural Adjustment Programs have been implemented, the effects of these programs on production efficiency, costs of production, competitiveness of West African agricultural products, and potential regional flows. The macro-economic and sectoral measures to counter negative impacts of these programs are also discussed. The authors conclude that the potential for West Africa sub-regional trade is significant but the policies aimed at improving basic infrastructure to increase the efficiency of marketing agricultural products need to be improved substantially.

Authors:

Abdoul W. Barry [abarry@aird.com] is a senior economist and has been with Associates for International Resources & Development since 1995. He received his Ph.D. in agricultural economics from Michigan State University. He has consulted for many bilateral and multilateral organizations including, USAID, World Bank, the United Nations Food and Agriculture Organization (FAO). He advised government officials and private sector economic operators in Africa in the design and implementation of economic and food policies. He has written several articles covering exchange and regional integration in West Africa.

B. Lynn Salinger [lsalinger@aird.com] is a senior economist with Associates for International Resources and Development. She has led numerous study and training missions on trade, regional integration, price, market, and competitiveness policy in Côte d'Ivoire, Ghana, Mali, Mexico, Morocco, Senegal, South Africa, and Tunisia, and has consulted with the World Bank on policy reform and export diversification in Algeria, Bangladesh, Romania, and Viet Nam.

Selina Pandolfi [spandolfi@aird.com], formerly an economist with AIRD in Cambridge, Massachusetts, is now a manager in the dot-com world. She served for two years as Project Administrator for the EAGER/Trade cooperative agreement.

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1. Introduction

Intra-regional trade in West Africa has regained attention after the devaluation of the CFA franc which took place in January 1996. This renewed interest is motivated by the potential trade of goods based on competitiveness which, for a long time, have been inhibited by an increasing overvaluation of the CFA franc. In fact, the overvaluation has generated a distorted flow of goods, thereby artificially stimulating imports for the member countries of the CFA zone and discouraging exports towards other countries. The affluence and the convergence of agricultural and industrial products towards the CFA zone motivated its members to erect tariff and non-tariff barriers designed to limit imports from non-African countries as well as from other West African countries, notwithstanding the existence of several regional organizations aimed at promoting regional trade.

At a time when large economic blocs are being formed in other regions of the world to foster trade among member countries, West African regional organizations are characterized by the failure to achieve their main objectives, as shown in trade statistics. The World Bank (1989) shows that intra-regional trade represents about 6% of total official trade of those economies. Even if informal intra-regional trade is taken into account, regional trade appears to still account for a small share of West African total trade.

Some analysts attribute the limited volume of trade among West African countries to similarities in agricultural production and to the non-complementarity of the different economies. According to these analysts, the lack of complementarity stems from the concentration of production in the same period, resulting in substantial increases in supply right after harvest, while there is general scarcity of food several months after harvest. This line of thought suggests that the comparative advantage of the coastal countries is similar to those of Sahelian countries, notwithstanding different factor endowments. This argument has been rejected by another line of thought which has generated several studies (World Bank, 1991; Salinger and Stryker, 1991; Badiane, 1992; Barry, 1994). The results of these studies show that the limited volume of trade is caused by the macro-economic and sectoral policies. Key among these are the industrial development strategies that could be viable only in an inward-oriented environment. These policies are generally incompatible with the desire of promoting trade and regional integration and they constitute inhibiting factors for trade in West Africa.

Another argument that has been recently proposed to explain the low level of West African trade, especially for agricultural trade, has pointed to economic and sectoral policies resulting from the implementation of Structural Adjustment Programs. The rationale behind this argument is that these programs, which have been negotiated individually by the different African countries, pursue only a behavior to reduce national budget deficits, without taking into consideration their impact on the productivity of the agricultural sector. Furthermore, the removal of input subsidies has resulted in a drastic reduction in the demand for chemical fertilizers, to the point where agricultural productivity has substantially declined, thus negatively affecting both the competitiveness of West African agricultural sector and agricultural trade flows. This would explain why trade flows among West African countries may have declined since the implementation of the Structural Adjustment Programs.

The object of the present study is to contribute to the debate on regional trade of agricultural products by starting with the underlying hypothesis of the second line of thoughts. To this end, the study will focus on a group of countries that includes Burkina Faso, Côte d'Ivoire, Ghana, Guinea-Conakry, Mali, and Senegal to attempt to provide an answer to the following questions:

1. To what extent have the Structural Adjustment Programs been implemented as expected?
2. What have been the effects of these programs on production efficiency, costs of production, competitiveness of West African agricultural products, and potential regional flows?
3. If the impact of these programs on the above mentioned indicators has been negative, which macro-economic and sectoral measures could be recommended to improve and promote both agricultural competitiveness and agricultural trade, thus enhance food-security in West Africa?

This study will, on the onset, describe the agricultural sector before the implementation of policies linked to structural adjustment. Moreover, it will focus on both the factors which induced the adjustment programs and the implementation of certain of their elements, keeping in mind the difference between the elements that have been proposed and those that have actually been implemented. Based on the knowledge of the measures that have been actually applied, we will then provide an analysis of their impact on the comparative advantage of these countries and on the competitiveness of agricultural products through their effects on factors and good markets.

2. Economic Growth and Intra-Regional Trade from Independence to Structural Adjustment Programs

2.1 Macroeconomic Environment

The record of Sub-Saharan Africa's growth has been one of the least successful among developing countries. Per capita income between 1965 and 1985 increased at a rate of 0.9% per year as a result of stagnating or negative growth rates experienced by the region in the second half of the 1970s. Exports of manufactured goods from Sub-Saharan Africa declined between 1970 and 1986, while other developing regions saw a significant rise in theirs. Many Sub-Saharan African countries depended on only a few commodities for exports, while growth in agricultural production rose to only 2% between 1965 and 1980 and fell to an even lower 0.6% for the first half of the 1980s (World Bank, 1993). The negative performance of these countries was a product of a number of domestic and external factors.

At the domestic level, the main cause for the low levels of growth has been poor macroeconomic policies. Following the end of the colonization period, many governments opted for protectionist measures that reduced significantly the competitiveness of Sub-Saharan African goods in external markets. Most countries

followed import-substitution strategies characterized by high barriers to trade which raised the cost of inputs and negatively affected growth. Overvalued exchange rates were also a persistent phenomenon throughout the region, as shown by the World Bank. It estimates that, before the adjustment period, the average parallel market premium was about 300%. Fiscal indicators for the period suggest the presence of a heavy burden on the economy resulting from massive government spending. In the early 1980s the average ratio of government consumption to GDP reached 17% in Sub-Saharan Africa, compared to 10-12% for other developing regions. Only indicators for human development (infant mortality, life expectancy at birth, education, etc.) and for financial development showed some improvement, although their level remained still low compared to other low and middle-income economies.

This situation generated a bias against the agricultural sector, upon which most of Africa's income depends. Agriculture had been more taxed in Sub-Saharan Africa than in other regions. Producers price for agricultural exports remained low relative to other developing countries as producers were forced to sell to state marketing organizations. But the agricultural sector was not the only one to be negatively affected by these policies. The private sector experienced a strong bias as well. Inadequate infrastructure, rent-seeking behavior, and complex bureaucracies resulted in increased transaction and absolute costs for the private business, while unstable macroeconomic environments, combined with the deterioration of governance, limited foreign investment.

At the international level, most Sub-Saharan African countries experienced a decline in their terms of trade (with the exclusion of the oil exporting ones), resulting in an income loss of about 5.4% of GDP in the periods 1970-73 and 1981-86. Such a decline, though, cannot account for a great part of the stagnation and decline in economic growth. The World Bank (1993) calculated that the decline in the terms of trade explains only 10% of the reduction in growth rates between the 1970s and the mid-1980s. Moreover, most low-income countries suffered the same deterioration in the terms of trade, but still managed to boost economic growth. External transfers partly offset the losses resulting from declining terms of trade. The share of net transfers to GDP for Sub-Saharan African countries increased from 3.7% in the early 1970s to about 7% by the early 1980s, the highest percentage among all low and middle-income countries.

Like most Sub-Saharan African countries, West African markets have suffered from inefficiencies in domestic production and marketing systems, stemming from inappropriate government policies that inhibited competition and the exploitation of economies of scale. Since the mid 1980s, there has been a significant effort towards the removal of such impediments. Under the aegis of the international financial institutions, West African countries have introduced policy reforms aimed at both building a sound macroeconomic environment that would stimulate domestic and foreign investment and enhancing productivity in the region, while reducing the role of the state in production, thus stimulating private activity. Moreover, the reform programs were designed to reduce the bias against the agricultural sector as a mean to reduce poverty and increase economic growth.

Structural Adjustment Programs have consisted, and still consist of a mix of policy reforms that target different sectors of the economy and that has an overall impact on growth. The “reform package” usually entails lowering trade barriers, such as tariffs and/or quotas that were raised at independence to increase state revenues, decrease dependency on a few products and external markets, and promote food security. The removal of trade barriers also includes the dissolution of state controls on exports and imports (e.g. the dismantling of marketing boards). Another important step toward market liberalization has been the realignment of the currencies vis-à-vis to the external markets, through either devaluation of pegged currencies (such as the CFA) or movement towards a more flexible exchange rate (such as in the case of the Ghanaian Cedi or the Guinean Franc). Trade liberalization and currency realignment were accompanied by further adjustment measures consisting of reducing the size and costs of the public sector, control on the rate of inflation, and increasing efficiency in the productive sector through fiscal incentives.

2.2 Intra-Regional Exports

One of the expected outcomes of policy reform is an expansion of the export sector, which is expected to have a positive impact on the rate of economic growth (Lopez, 1990, and Nishimuzu and Page, 1984). Both the traditional and non-traditional export sectors are to benefit from the reforms, although the patterns of trade are quite dissimilar for the two. Traditional exports, in which West Africa has a strong comparative advantage, have recorded some decline because of demand and supply limitations, although they still represent the highest percentage of exports from West Africa (only about 11.3% of African food exports in 1990 went to other African countries). The expansion of non-traditional exports has been the focus of a great part of the trade literature, which recognizes its key role to economic growth in most African countries for the next two or three decades. At the same time, expansion of non-traditional exports entails a significant and often costly adjustment of the economy in order to produce goods that can be competitive in the external markets.

Traditional and non-traditional exports play a significant role in intra-regional trade. Salinger and Stryker (1992), analyzing the competitiveness of traditional agricultural production in Senegal, Guinea, Mali and Côte d’Ivoire, found that the potential for intra-regional trade of agricultural exports in West Africa is significant, provided that major policy reforms aimed at the removal of distortions in the economy are implemented. A study carried in 1994 (WALTPS, 1994) by a multidisciplinary team also found that increased rate of urbanization and population growth in West Africa will increase demand in the region. The importance of intra-regional trade is based on two main factors. The first one rests on the general gains in terms of efficiency that trade creates. The second one is more specific to the characteristics of the region. In many instances, West African countries have a comparative advantage in the production of goods that are neither fully consumable domestically or exportable overseas. The region is thus an efficient market upon which to reallocate excess supply.

The encouragement of intra-regional trade has generally been associated with the institution of regional agreements, albeit some researchers warn against the euphoric impetus that regional integration has registered in the past decade as a means to achieve intra-regional trade. Radelet (1996) suggests that regional integration has done little to promote intra-regional trade in developing economies. His study traces the cause of such negative performance in the inward-orientation that has characterized regional integration agreements, as well as the problems related to the distribution of benefits among member countries when the income gap of such countries is quite wide (such as the case of Nigeria in ECOWAS).

2.3 Regional Organizations

Desire for regional integration started in the early 1960s, although most regional organizations did not come to light until the mid-1970s. In 1975, ECOWAS (Economic Community of West African States) was formed under Nigeria's leadership with the purpose of defining a free trade area and a Customs Union. Its centerpiece was the Fund for Cooperation, Compensation, and Development, which should guarantee an equal redistribution of profits derived from trade liberalization. Radelet (1996) argues that the organization had not been able to establish a free trade area nor an efficient customs union, due mainly to structural differences among the participating countries.

West African Economic Community (CEAO) was created in 1973 and it included until its dissolution in 1994, the members of the West African Monetary Union (CFA zone). Its main vehicle for regional integration was a preferential duty regime among its members seeking to lower import taxes on goods produced in the Community. Although Robson (1983) argues that CEAO has been among the best performer among regional organizations in terms of increasing regional trade, it still has not been very successful in promoting trade among its members. It has, rather, generated a protective structure against the outside for its weakest participants. As a result, it created productive inefficiencies in these countries. CEAO was replaced in 1994 by the Union Economique et Monétaire Ouest-Africaine (UEMOA).

Finally, we can cite the Mano River Union (MRU) which has existed since 1973. It includes Liberia, Sierra Leon, and Guinea. But, intra-regional trade among its members has stagnated, owing to the existence of high tariffs and not-tariff barriers and lack of complementarity across production structures.

3. Agricultural Production before and during Structural Adjustment Programs (SAPs)

Agricultural production in Sub-Saharan Africa has performed poorly. During the period from 1965-1980, agricultural value-added for Sub-Saharan African countries grew on average at a rate of 1.8%, while population grew in the same period at 2.7% per year. While the growth of population increased at a rate more than 3% per year during the following decade, agricultural growth rate decreased to 1.4% per year. The trend is

even more disappointing if we consider that between 1980 and 1990 the growth rate of the agricultural production was 4.8% per year for East Asian and Pacific countries, 4.3% for middle-eastern countries and North Africa, 3% in South Asia, and finally, 1.9% in South America and the Caribbean. At the same time, agricultural exports for Sub-Saharan African countries declined while they increased in other developing regions of the world (Cleaver, 1993).

At independence, most West African countries were experiencing a generally positive trend in agricultural production. Real agricultural GDP in Côte d'Ivoire grew at an annual rate of 4.5% during the 1960s and at an annual rate of 3.3% during the 1970s. In Ghana, production of the main agricultural goods showed a steady increase until the mid to late 1970s. In the late 1970s, agricultural production registered a significant decline, owing to inward-looking policies.

Food production in Ghana rose steadily until the 1970s and then fell across all products, due mainly to a severe drought and more importantly to lack of producer incentives and a deteriorating transport system. Producers were heavily taxed in order to support increasing budget deficits. There was a general shortage of spare parts and fuel and the road network deteriorated. A final strike was given by the fall of the international prices of cocoa, Ghana's main export, which decreased substantially the capacity of the government to finance already high expenditures.

The performance of the agricultural sector in Côte d'Ivoire started deteriorating in the early 1980s, (between 1980 and 1986 the rate of growth was -1.2%) due to inefficient macroeconomic and sectoral policies, accompanied by a sharp drop in the international price of its main export crops. Among the main factors behind the inefficiencies of the sector were the powerful rents created by the heavy taxation of primary producers necessary to sustain a large bureaucracy. Export and input taxes, in combination with an overvalued real exchange rate, diminished the income of the rural sector and hindered adoption of technologies to enhance production. Budget constraints, moreover, reduced also the volume of public investment in the agricultural sector. In addition, prices of cocoa and coffee declined in the 1980s, while the dollar depreciated. Towards the end of 1980s, the price of the export commodities fell further, resulting in increased taxation and reduction of government expenditures in order to limit public deficit.

Throughout its socialist years Mali experienced some political stability which allowed the state to implement long term industrial and agricultural policies. The aim of the government in those years was to stimulate industrialization and urbanization, while at the same time introducing modernization in agricultural production. Like most other countries in the region, producers and consumer prices were fixed by the state, which also took charge of cereals marketing. Given these policies, the Malian franc became rapidly overvalued and inconvertible, reducing significantly the competitiveness of domestic products. Low producer prices and controlled marketing consistently lowered incentives to farmers. An attempt to revert to a more profitable economy was undertaken during the early 1970s. Producer prices were raised, but exogenous factors such as the

oil shocks and the droughts of 1972-74 offset the potentially positive outcomes of the interventions. Agricultural production fell again in the early 1980s, after a short period of recovery, with crop output declining in 1984 by 20% and herds by 35% (USAID Mali, 1988).

Guinea saw as well between 1973 and 1981 a decrease in revenue and both agricultural and livestock production. Although exogenous factors such as the droughts and the oil shocks of the 1970s had an inevitably negative impact on agricultural production, the main factor of such poor performance can be traced to the implementation of unsound policies from the part of the government. Among these were the existence of an overvalued exchange rate which affected the competitiveness of Guinean exports negatively, state controlled marketing and collective farming, a high number of import taxes and subsidies as well as barriers to domestic trade, poor transport infrastructure, and a large inefficient public sector which drained heavily the country's already limited resources. As a result of these policies, production and exports of crops declined steadily, while imports of food products increased significantly. While some reforms were implemented in the early 1980s, such as the removal of almost all state marketing quotas in favor of an expansion of the private sector, numerous distortions in the domestic market still remained. During the First Republic, agricultural markets were almost totally monopolized by the state. Producer prices were established by the state on the basis of official consumer prices. For example, the price of rice, which is the major staple food of the country, was maintained low through an overvalued currency, resulting in a major difference between official and parallel markets. The widening of this gap sparked rent-seeking behavior which diverted products from the official channel to the more profitable private market, while imports and inflation soared. Stryker et al. (1989) report that in the early 1980s the parallel markets were supplying about 80% of total urban demand for goods and almost the totality of the demand for marketed consumer goods outside Conakry.

The economic performance of Senegal after independence was quite encouraging until the country lost the privilege of having guaranteed prices for export crops in 1966. The Senegalese economy has been characterized by a heavy tertiary sector, consisting of a large and relatively well paid government sector, and the dominance of groundnut production in the agricultural sector. The high paid public sector burdened the economy not only in terms of government expenditures but also because its wages set the benchmark for wages in the private sector, thus resulting in a loss of competitiveness for domestic products. Senegal's deep crisis started when the country experienced windfall profits from exports in the second half of the 1970s following an increase in the prices for groundnuts and phosphates (the biggest mineral export for the country) quadrupled. This led to a substantial increase in government spending, with investments mainly in the establishment of an export-oriented industrial processing of primary commodities. In the late 1970s, Senegal experienced a deterioration of its current account when exports declined and imports soared, while the country faced the collapse of the agricultural credit system.

3.1 Adjustment Programs and Trade of Food Products

The limited size of the West African markets characterizes them as price takers for most commodities. This implies that the regional economies are significantly vulnerable to fluctuations in the level of world prices for commodities. Nevertheless, as we described above, there are numerous endogenous factors to which the negative performance of the West African countries can be traced. The competitiveness of agricultural production is constrained in West Africa by low levels of labor productivity and relatively high wages, inadequate financial markets which result in capital shortages, diminishing access to arable land and water, poor distribution systems that affect the availability of both inputs and outputs, obsolete infrastructure, and finally, the set of economic and investment policies adopted by the state. It was in this perspective that major policy reforms were designed during the 1980s under the Structural Adjustment Programs which were implemented under the aegis of the international financial institutions.

The implementation of Structural Adjustment Programs in West Africa is characterized by similar policies across different countries. These policies consisted mainly of realignment of the currency, liberalization of domestic markets, and freeing trade regimes.

The devaluation of the CFA franc, as well as the move toward flexible exchange rates for other currencies have played a major role in the definition of the new economic scenarios. All countries in the study experienced during the adjustment period significant devaluation or realignment of their currencies. Already in the early 1980s, FAO recommended for Côte d'Ivoire a formal devaluation of the CFA franc, although at that time it argued that the feasibility of the policy was impaired by the multiplicity of countries.

Stryker et al. (1994) assume that the impact of devaluation on crop agriculture is a function of a number of factors. On the supply side, the financial profitability of production depends on the tradable-input intensity of the production and on the output price. If the content of tradable inputs is high, financial profitability will decrease, albeit this is partially compensated by the decrease in the relative cost of non-tradable (especially labor). This will be true if the increase in input prices is greater than the increase in output prices. In the case of horticultural products and coarse grains, for which production is labor-intensive, a decrease in the real cost of labor following devaluation should thus result in an improvement of the competitiveness of the production, provided that the increase in output prices is at least equal to the increases in input prices.

Thus, devaluation of the currency generates a change in the relative prices of tradable and non-tradable goods. But price incentives have also been brought by direct intervention on them. Price incentives represent a fundamental factor in stimulating agricultural production. Properly implemented changes in the relative prices of goods allow shifts in both production and consumption of such goods, resulting in a more

efficient and productive allocation of resources. In the case of Senegal, FAO recommended that an increase in the relative price of rice to the level of its domestic cost to millet would shift consumption to domestic millet from imported rice, while an increase in domestic price of millet would shift the production to millet from groundnuts in order to adapt to the shift in demand for food crops for local consumption. The suggestion was based on the assumption that millet and rice were substitutes.

Liberalization of prices, mainly accompanied by the dissolution of state marketing boards, has been implemented across most countries, although at different time for different products. Prices and markets for coarse grains, for example, have traditionally been more liberalized than those for other goods, while state control on rice through marketing boards started declining only around 1995. In Guinea, export procedures in the late 1980s were still quite cumbersome due to the multiplicity of taxes, fees, controls, and procedures. At the same time although imports tariffs have been significantly lowered for most products, the government still regulates rice imports. In Ghana, output prices have been market-driven rather than artificially imposed by the state after the implementation of the Economic Recovery Program. The removal of marketing boards and price distortions was also part of the reform program in Côte d'Ivoire.

In Guinea, following the implementation of the reform policies, the outlook for the agricultural sector has significantly improved. Although less important than before independence, cash crops (coffee, horticultural products) still contribute substantially to Guinean exports. Since the implementation of reform programs, most coffee exporters are now private (six out of seven traders) and the same is true for horticultural products exporters.

In summary, Structural Adjustment Programs in the 1980s were designed to increase diversification of the agricultural sector towards the production of goods with high comparative advantage as opposed to goods with declining economic benefits, while at the same time restoring competitiveness of domestic production by reducing high costs. These programs entailed improving financial assistance to farmers and investing in high priority activities in rural areas, in order to complement macroeconomic policies.

4. Comparative Advantage, Competitiveness, and Regional Trade

The object of this chapter is to discuss the comparative advantage of a group of products from different countries before and during the implementation of Structural Adjustment Programs (SAP) in order to predict the potential directions of trade flows. Then the impact of SAP on the competitiveness of these products, and on the trade flows between the national and sub-national markets of West Africa is evaluated. This study assumes that the devaluation of the CFA franc that took place on January 12, 1994 constitutes the culminating point of SAP for the countries of the franc CFA zone. Therefore, this date represents the cut-off point between before and during the SAP. The

calculations for the period before the SAP are based on data collected in 1990, while the data relative to the structural adjustment period are those of 1995.

4.1 Comparative Advantage before Structural Adjustment Programs

4.1.1 Methodology

The estimation of comparative advantage is essentially based on the Domestic Resource Cost (DRC) coefficient, which is derived from the economic analysis whose foundation is the notion of opportunity costs of resources (see annex for a detailed explanation of the methodology).

In summary, the DRC is the ratio between the economic cost of all non-tradable resources (capital, land, water, labor, etc.) employed to produce one unit of the final good, and the added value of tradable goods, converted into local currency through the shadow exchange rate. A DRC lower than unity (<1) for a specific product on a specific market indicates a positive economic profit for the country of production which therefore has a comparative advantage in the production of such a good. In contrast, if the DRC is greater than unity (>1), the country of production is said to have a comparative disadvantage in producing and marketing the good to the specific market.

We should bear in mind that the analysis of the comparative advantage of nearly all the West African agricultural commodities, except groundnuts, are treated as import substitutes. Therefore, their relevant reference price is the CIF price, adjusted to the consumption point.

4.1.2 Coarse Grains

The results of the analysis presented in table 1.1 suggest that the production of coarse grains in the CFA countries was efficient before the devaluation of the CFA franc. The same results are obtained for Guinea at the beginning of the 1990s. At the same time, all coastal countries lose their comparative advantage for maize and millet/sorghum when these products are shipped towards the large coastal consumption centers, indicating also relatively high transport costs in West Africa. The comparative advantage for these West African countries seems generally stronger for those production systems that generate relatively higher yields.

On the other hand, the results show that the potential for regional trade of coarse grains is quite significant, especially between Mali with a comparative advantage in millet/sorghum and Côte d'Ivoire with a comparative advantage for trade in maize. Northern Guinea could also ship maize to Mali, especially during the hungry season. Similarly, Mali could provide Eastern Senegal with millet/sorghum. In any case, Southern Mali and Central Guinea would have serious difficulties in providing coarse grains to Northern Guinea and Eastern Senegal, due to high transport costs.

4.1.3 Rice

Like coarse grains, the production of paddy seems to perform quite well, albeit the economic cost of local rice consumed in the coastal cities seems higher than the economic benefit that the West African societies could derive from it. The potential for trade flows of this product, although it would appear to be high, is more limited than those for coarse grains. Guinea appears to have the greatest potential in providing rice to a significant part of the vast Malian territory. Mali could also ship rice to Northern Côte d'Ivoire and even further from this consumption area, towards the central part of the country. However, Mali's comparative advantage in supplying Côte d'Ivoire is hindered by high transport costs.

4.1.4 Horticultural Products

Until today, very little information is available on both costs of production and marketing and regional trade flows of horticultural products. The limited data available allow us to forecast that Burkina Faso, Mali, and Niger could provide the coastal countries with horticultural products (onions and green beans), given the favorable natural climate of the Sahelian areas. Senegal could, as well, export groundnuts and groundnut oil to Mid Guinea and Western Mali. But beyond these areas, high transport costs will play a hindering role in the regional trade flows of these goods.

4.1.5 Livestock

Differences in climatic and agro-ecological conditions determine to a great extent the producers-exporters and the net consumers of meat in West Africa. Livestock, primarily concentrated in the arid and semi-arid zones and on the Nigerian and Guinean plains, gives a natural comparative advantage to these areas and generates flows between Sahelian and coastal countries. It is therefore not surprising that coastal countries constitute the preferential market for Sahelian livestock.

The analysis carried out by Associates for International Resources and Development (AIRD) confirms that Sahelian countries have a strong comparative advantage in providing the coastal countries with live animal. This comparative advantage is mainly a function of the use of pasture and forage which have currently very low opportunity cost. At the same time, the economic benefit of the traditional production systems of the coastal countries is decidedly above zero on coastal countries, although their productivity is lower than that of the Sahelian countries. The comparative advantage of these systems is a function of their vicinity to the consumers' markets, thus benefiting from more moderate transport costs relative to those of Sahelian livestock.

This comparative advantage would still look strong even if the cost of labor and capital were to increase or if production would decrease significantly. This suggests that the natural conditions play an important role. This conclusion rests on the European subsidies on their exported meat, proving once more the robustness of the comparative advantage of West African countries in the production of meat.

4.2 Comparative advantage during Structural Adjustment Programs

Structural Adjustment Programs are generally aimed at a more efficient reallocation of resources based on comparative advantage. For this to take place, they recommend a disengagement of the State from production and limit its role to the implementation of those actions necessary to create an open economy, whereby the economic agents can react freely to changes in market conditions. These agents are assumed to react positively and dynamically to changes in market prices if favorable institutional and physical conditions exist, leading thus to dynamic comparative advantage. For example, if the basic infrastructure is provided by the State and the legal environment ensures a reduction in transaction costs, then price incentives will induce producers to increase investment to improve agricultural productivity. Once this happens, this enables them to reduce their cost of production. This reduction results in the reinforcement of the comparative advantage or in the creation of a new comparative advantage, *ceteris paribus*.

The devaluation of January 1994, inasmuch as it was an isolated phenomenon, did not have, in principle, a direct effect on the comparative advantage of the West African countries, given that the analysis had taken into account and corrected the overvaluation of the CFA franc in the economic analysis. Nevertheless, the devaluation has modified the structure of the markets for goods and of tradable factors of production. Thus changes in relative prices resulted in changes in incentives for the demand of intermediate goods, which had an impact as well on agricultural productivity and unit costs.

The devaluation has also had an impact on marketing activities through its effect on transport costs. Although the greatest part of transport costs has increased following the devaluation, the increase has been partially offset by the liberalization of the transport sector which took place well before the devaluation. Changes in transport costs have an impact on marketing costs of not only locally produced agricultural commodities, but also imported products, making it quite difficult to predict changes in comparative advantage. In these conditions, how did comparative advantage change following the liberalization of the transport sector and the modification of the exchange rate?

4.2.1 Impact of Structural Adjustment Programs on Coarse Grains

The implementation of Structural Adjustment Programs has had a limited influence on the productivity of coarse grains. Maize yields in Côte d'Ivoire have declined slightly (-1% per year), while those of millet/sorghum in Mali experienced a marginal increase (less than 1% per year), resulting therefore in a modest change in comparative advantage of these countries on consumption markets. Although we do not have information on the consumption of inputs before and after the implementation of Structural Adjustment Programs, we could nevertheless assume that the small decrease in yields in Côte d'Ivoire is caused by the increase in input prices, which was not offset by a proportional increase in output prices. The decrease in the use of inputs is even

more attributable to the fact that production of grains is quite unpredictable, given its dependence on rainfall.

We can also observe a slight decrease in comparative advantage on certain consumption markets close to the coastal areas, probably due to the increases in transport costs between the production areas and the cities on the coast. In contrast, the comparative advantage on Sahelian markets distant from the ports appears to have improved slightly, owing to increases in transport costs which have a negative impact on imported goods.

4.2.2 Impact of Structural Adjustment Programs on the rice subsector

Unlike the case of coarse grains, the Structural Adjustment Programs appear to have a significant impact on rice productivity in the Sahel. In fact, paddy yields have increased at least 3% per annum in the Sahelian countries. This growth has been even greater for Mali, averaging nearly 10% a year after the devaluation of the CFA franc and reinforcing of the country's comparative advantage on the regional markets. Just by taking into account the increases in productivity, Mali could provide rice to Central Côte d'Ivoire and even to some cities close to the coastal areas. However, the improvement in Mali's comparative advantage has been moderated by the increases in input costs and especially in transport costs between the two countries, thus limiting Mali's comparative advantage in Central Côte d'Ivoire. Under these conditions, Malian rice could be shipped only to the bordering zones of Senegal and Guinea.

4.2.3 Impact of Structural Adjustment Programs on horticultural products

Structural Adjustment Programs appear to have had a positive impact on Senegal's comparative advantage in the production of groundnuts, generating a moderate increase in the estimated yield per hectare (about 1.5% per year) and strengthening Senegal's position on consumers markets. The beginning of the privatization of SONACOS, following negotiations between the government of Senegal and the World Bank, could result in a reduction of the costs of processing groundnut into oil and therefore increase Senegal's comparative advantage in the neighboring markets. Nevertheless, high transport costs due to the lack of a sea link among West African countries could be a significant obstacle to the growth of groundnut trade and their by-products (oil) between Senegal and its neighbors. This growth is also impaired by the existence of numerous vegetable oils which are substitutes for groundnut oil.

4.2.4 Impact of Structural Adjustment Programs on livestock

The results of the analysis undertaken by Metzel (1995) show that Mali's comparative advantage has strengthened after the devaluation of the CFA franc. Nevertheless, the analysis was not aimed at measuring the impact of Structural Adjustment Programs on the livestock subsector. Comparative advantage depends not only on production costs but also on international prices and on the exchange rate. He did not isolate the effect of these exogenous elements on comparative advantage.

Sahelian countries have no influence on international prices. Nor do they have an impact on the exchange rate between the French franc and the US dollar.

4.3 Competitiveness and regional flows before Structural Adjustment Programs

The basic principle of the analysis of competitiveness of West African agricultural products lies in the capacity of the producers and/or traders to make financial profit, consisting of the difference between the unit price of the final good and all of its unit costs. These include costs of production and marketing to this market (see annex on methodology). The basic hypothesis of this analysis stems from the principle that the production and marketing of a good in a market will take place as long as they are financially profitable. In such context the activity is said to be competitive and viable. In contrast, a financial loss indicates that the activity is not competitive and viable given the market conditions.

The results that are discussed here assume that for the production of groups of agricultural commodities, family labor is valued at the average day rate of agricultural workers in rural areas, which is the opportunity cost. The rationale behind this estimation of family labor cost is the fact that the West African agricultural sector is going through a transformation leading to a complete monetization of the sector. The retribution of family labor at the rate of the salaried labor force could nevertheless increase if the family's food self-sufficiency is considered to be a priority with respect to financial gains. Under these conditions the discussion will focus more on the production side and less on the marketing aspects.

4.3.1 Coarse Grains

In the light of the results of the analysis, it appears that the systems of production that have been studied have generated negative returns if labor is valued at the daily rate of hired labor. The fact that these systems have survived until today seems to indicate that the daily return to family labor is lower than the on-going wage rate. In fact, this return varies between 200 and 500 CFA franc per day depending on the price of coarse grains and their costs of production, suggesting that the principal motivation for producers is not financial profitability, but rather safeguarding the family's food self-sufficiency. The corollary of such hypothesis is that the volume of grains sold in the market represents the excess production aimed at providing an income for the family for the satisfaction of other needs. The yearly surpluses, which are quite variable as a result of the strong dependency of grain production on rainfall, partly explains the instability of regional trade. Taking into account the limited availability of statistics on these trade flows, wouldn't these fluctuations result in uncertainty which would moderate the desire of producers to market significant volumes of coarse grains?

4.3.2 Rice

The results of the financial profitability study suggest that rice is quite competitive in almost all consumers markets and pays well family labor in the production areas. This competitiveness could result from the relatively high yields of irrigated rice for which the producers pay only royalties for the use of water through the irrigation infrastructure. Given these royalties, what should be the competitiveness of local rice if the producers were charged part of the amortization costs of investment in the irrigation network?

Besides the fact that local rice pays only royalties on water usage, it also benefits in large measure from tariff and non-tariff protection which allow the price of rice on the consumer market to increase artificially. An example of the protectionist policies on local rice is the *Péréquation* system that was in place in Senegal until 1996 and aimed not only at subsidizing the irrigation infrastructure and the parastatal services, but also at homogenizing the price of broken rice imported in the domestic market (Hibou, 1990). Mali's protectionist policy was exercised through the control of rice sales and imports as well as high tariff rates as a means to increase domestic price of rice and provide an incentive to local producers.

Like Senegal, Côte d'Ivoire taxes the imports of rice and has adopted a *Péréquation* system which, in contrast with Senegal, consists of creating a panterritorial pricing scheme. Guinea applies a less severe protectionist policy than Senegal or Côte d'Ivoire. Nevertheless, rice imports in Guinea are limited by an exchange control. In summary, West African local rice benefits from some sort of protection, whether tariff or non-tariff.

4.3.3 Horticultural Products

As illustrated above, studies on the competitiveness of fruits and vegetables before the implementation of Structural Adjustment Programs are quite rare. The ones that are available limit their analysis to the impact of the devaluation of the CFA franc on producers' profits. They show that, in general, profits have increased following the devaluation and that competitiveness has therefore improved (Kergna and Koné, 1996; Illy, 1996; Asante and Wayo, 1996). Well before devaluation took place, studies that have been done on fruits and vegetables in the Sahel have showed that their production is generally more profitable than that of cereals or some export products such as cotton (Nicholson and Stathacos, 1992). This proposition needs to be confirmed for the humid coastal areas. At the same time, their production is not generalized in the sub-region. Given these conditions, shouldn't research focus in particular on these products with the aim of removing constraints to their supply and design coherent policies for the development of these products?

4.3.4 Livestock

Notwithstanding the droughts of the 1970s and 1980s and the protectionist policies implemented by coastal countries, especially Côte d'Ivoire, West African livestock - especially Sahelian livestock which has a low content of tradable inputs - has shown to be quite competitive both on the consumer markets in the Sahel as well as in the great urban coastal centers. This competitiveness has, nevertheless, decreased over the years, owing to: (1) growing European export subsidies to the meat commonly called "capa", which have increased from about 125 FCFA/kg in 1974 to more than 700 FCFA/kg in 1993; and (2) the overvaluation of the FCFA which has progressively stimulated the import of non-African meat at the expenses of Sahelian livestock (Stryker, Salinger, and Metzel, 1994). The authors suggest that the cumulative effect of economic policies, including overvaluation, has penalized more the Sahelian production systems than those of the coastal areas, since they have a higher content of tradable inputs in order to transport Sahelian meat towards these areas, constraining regional trade as well.

4.4 Competitiveness and regional flows during Structural Adjustment Programs

If we consider the devaluation of the CFA franc as an essential element of Structural Adjustment Programs, it is natural to ask ourselves what impact devaluation had on the financial profitability of West African products. This question is even more crucial since the devaluation had an impact on relative prices and transport costs of goods from areas of production to the consumption markets.

On the basis of the above mentioned changes, the competitiveness of maize for Mali and Côte d'Ivoire has been positively affected both in the production and in the consumption areas. Nevertheless, the financial profitability of maize consumed in the production areas would still be negative if family labor was valued at its opportunity cost. Millet and sorghum appear to be more competitive since the devaluation of the CFA franc. Similarly, rice produced in Mali and exported to the neighboring countries appears to be slightly more competitive after the devaluation. This new competitiveness of Malian rice results from the substantial increases in yields in the zones of production of the Office du Niger. Senegalese rice consumed in Mali will also be more competitive than in the past given relatively high prices of rice in Mali.

Although we will try to explain the competitiveness of horticultural products on different consumers markets in the sub-region, the only information available is for the profits of the producers. Studies carried under the aegis of the Institut du Sahel (INSAH) in Mali show that the devaluation of the CFA franc seems to have had a positive impact on the revenues of horticultural producers, and thus, on the competitiveness of their products.

The analysis of the marginal revenues based on financial calculations of livestock suggest that it is positive for all systems of production that have been evaluated, even taking into account opportunity costs of labor and capital used by the breeder (Metzel, 1995). These conclusions seem to hold notwithstanding the sale market of the products

(Accra or Abidjan). The aggregate marginal revenues in the livestock sector have sensibly increased after the devaluation of the CFA franc since consumers' prices in Accra and Abidjan have almost doubled, while the price of tradable inputs only seems to have doubled as well. These inputs represent between 20 and 25% of the total cost of production and marketing. The other costs relative to non-tradable resources (labor, feed, etc.) have increased only by about 30%, depending on the rate of inflation resulting from the devaluation.

The devaluation of the CFA franc has made prohibitive the import of non-African meat in Côte d'Ivoire, allowing Sahelian meat to become more competitive and increasing its demand on the Ivorian market. This renewed gain in competitiveness resulted in the opening of other markets as well to Malian meat, notably that of Ghana whose improved economic performance has stimulated an increase in the demand for meat.

In conclusion, the devaluation of the CFA franc inasmuch as it has been one of the major elements of Structural Adjustment Programs has had a positive impact on both the comparative advantage of West African countries and the competitiveness of their agricultural products, notably rice produced in Mali. Although the financial profitability of coarse grains becomes negative once family labor is estimated at its opportunity cost, the competitiveness of these products has improved since the devaluation.

5. Constraints to Regional Trade in West Africa

There is general consensus among development economists that policies that fostered opening of economies and trade result in a positive impact on income growth (Rodrik, 1994; Edwards, 1993; Dollar, 1992; Balassa, 1978). The impact of trade is even stronger if efforts are undertaken with the aim of removing physical and institutional constraints.

The object of this chapter is to detail the elements that impair the development of regional trade. More specifically, the analysis will look at the general constraints that hinder the different sub-sectors. These include the inefficiency of regional institutions and the lack of coordination of national trade policies, the weakness of the functioning of agricultural input markets, the lack of coordination of agricultural market information systems, high transport costs, and the abuse of law enforcement officials. Once these constraints are discussed, the chapter will analyze those that are specific to the different sub-sectors with the aim of defining specific recommendations in order to increase regional trade on the basis of the existing comparative advantage.

5.1 General Constraints

5.1.1 Institutional inefficiency and lack of regional trade policies

As mentioned above, in West Africa there are a significant number of sub-regional organizations aimed at promoting regional trade. Their impact on trade has nevertheless been quite limited and raises questions about their existence. The negative performance is even more significant given the fact that these institutions have shown very limited intellectual leadership about the needs of complementarity among the different zones of West Africa. We could imagine an operational structure articulated around groups of products (cereals, horticultural products, oils, livestock) with the aim of carrying frequent analyses on competitiveness and designing concrete propositions in terms of sectoral policies to promote regional trade, as well as export to the international markets. Each study group should follow not only the evolution of the costs of production and marketing of West African agricultural products, but also the fluctuations of international prices and the forces behind those. This kind of follow-up would allow to a great extent to set up macro-economic and sectoral long and short-term policies to improve the competitiveness of agricultural products.

5.1.2 Backsliding of Economic Reforms

Following the implementation of reforms, a few West African countries have tried to review some of the decisions of economic policy. An example that confirms this turn-around is the case of Nigeria, which has imposed restrictions on trade since 1994. Ghana, to a lesser extent, has also experienced some policy reversals which are characterized by growing budget deficits, sparking rapid inflation. This, in turn, has resulted in a constant depreciation of the exchange rate. As a result, Ghanaian products are artificially more competitive than those of neighboring countries, especially those of the CFA zone with a fixed exchange rate, generating distortions in regional trade. This situation, which could generate regional trade in the short run, will have a negative effect on the trade in the long run, inasmuch as it creates growing uncertainty in the eyes of economic actors who find it more difficult to plan, and generates rent-seeking behavior rather than stimulating productive activities, thus discouraging trade based on complementarity.

5.1.3 Weak Input Markets

Born out of the incapacity of African countries to limit their appetite for expenditures, Structural Adjustment Programs were aimed at re-establishing macro-economic balances. One of their easier components was the removal of input subsidies. Given this objective, parastatals marketing inputs became useless, although their function has not been taken over by the private sector to replace the State. A major consequence, with the exception of the distribution system created by the Compagnie Française de Développement des Textiles (CFDT), has been the breakdown of the commercialization of inputs which, to these days, is still very weak in most countries. A staggering example of the weakness of input markets is that offered by Guinea where the supply of inputs is

almost nonexistent, with the exception of producers which are part of specific agricultural projects. As a result, the agricultural productivity is generally quite low outside these projects. One could speculate that the non-usage of agricultural fertilizer finds also an explanation in the non-profitability of production systems which essentially depend on uncertain rainfall patterns.

5.1.4 Lack of Coordination among Market Information Systems (MISs)

Since the implementation of Structural Adjustment Programs, significant efforts have been made to provide information on prices of agricultural products to producers and traders. In practice, every country of this sub-region has at its disposal a MIS which covers agricultural products. Unfortunately, the data provided by MISs are generally limited to cereals. To these days, only the MIS of Côte d'Ivoire provides information on some horticultural products. It would be recommendable that the neighboring MISs do the same.

In the prospects of regional trade, the usefulness of MISs is to allow producers and marketers in the sub-region to have timely information on prices for all West African countries and thus provide them with the possibility of knowing the supply and demand conditions on regional markets. MISs should thus not only collect information on prices, but also on volumes available in the market. Information about the volumes are even more important since business people, such as those belonging to the West African Enterprises Network (WAEN), would like to engage in regional trade for large volumes of agricultural commodities. It is thus necessary that the different West African MISs coordinate their activities and exchange information not only on prices, but also on volumes.

5.1.5 High Transport Costs

One of the major characteristics of West African trade is high transport costs between the production zones and the consumption markets, which affect the competitiveness of agricultural products as well, especially in markets located in the center of the coastal countries. Even if the transport sector has been liberalized to some extent in order to reduce costs, these are still quite high (Camara, 1992; Gaye, 1992; Savadogo et al., 1992; Gabre-Madhin et al., 1992). These studies show that transportation costs represent more than half of total transfer costs of agricultural products in West Africa. One of the factors that contribute to such high costs is high taxes and duties on imported utility vehicles, which amount to about 60% of its book value (INRET, 1989). Although the rationale for such high taxes is to limit the drain of foreign exchange, they represent a significant entry barrier in the transport sector, reducing as well the supply of transport services in the sub-region. Another factor explaining high transport costs is the poor conditions, especially during the rainy seasons, of the road network which force vehicle owners to charge high costs in order to amortize rapidly the cost of their vehicles.

Sectoral policies of transport aimed at reducing transfer costs could have a positive impact on the competitiveness of local agricultural products. They could as well improve the competitiveness of imported products, thus generating doubts in the mind of policy makers. Nevertheless, their impact on consumers is predictable since lower transfer costs mean lower prices of agricultural products to consumers and therefore increases in demand. This would also result in an increase in regional trade and improved food-security for West African populations.

5.1.6 Abuse of Law Enforcement Officials

The rules of the ECOWAS which allow free circulation of people and goods are often not applied and are in sharp contrast with the frequently abusive attitude of law enforcement officials. Even if the direct financial costs generated by the constant holdings of goods at barriers created by the border patrols seem quite negligible (Salinger and Barry (1995) calculate that it amounts to about 1% of the price of agricultural products), the abuses of law enforcement officials generate indirect costs. They consist of time lost to negotiate the illegal taxes. This fact tends to block vehicles and thus reduce the supply of transport services. These barriers also result in direct losses of transported goods, which, once accounted for, increase the costs of abuses. These abuses are even more important since they are a source of discouragement for private agents who do not master the procedures or for those who would have the intention of investing in regional trade. Finally, they reduce competition and also lower food security by keeping prices of agricultural goods artificially high.

5.2 Sub-sectors Constraints

The analysis of the specific constraints for the sub-sectors is carried out by regrouping the different products as explained above. Thus, the constraints will be analyzed for coarse grains, rice, horticultural products, and livestock.

5.2.1 Coarse Grains

Generally aimed at ensuring household food security, the supply of coarse grains is constrained by the volatile character of its production. Almost exclusively dependent on rainfall, the production of cereals is constantly subdued to exogenous forces, resulting in a limited use of chemical fertilizer and weak productivity, which generate small returns and induce policy makers to limit exports in order to satisfy domestic demand. Generally, food policies have been articulated with this purpose, especially in those Sahelian countries where coarse grains are the main staple. These policies, even if justified in the light of the welfare of the population, represent a serious obstacle for the promotion of regional trade (IRAM-INRA-UNB, 1991).

The increases in prices of coarse grains generate a shift in consumption towards rice. This shift is even more significant given the fact that the production of grains is handicapped by the lack of appropriate processing technology aimed at increasing their use. Work done by IFPRI (International Food Policy Research Institute) and Michigan

State University shows that coarse grains are increasingly being relegated to a second place in consumption, since their processing requires hard work for women whose opportunity cost is increasing, given the rate of urbanization. The challenge for researchers and policy makers is thus to find appropriate processing techniques for coarse grains that diminish the work time of women and increase coarse grain consumption, especially in the urban centers where the average income is generally higher than in the rural areas.

5.2.2 Rice

Rice, heavily consumed in urban centers, is a source of great discussion at the level of political economy. The constraints that impair its sub-regional trade are generally institutional in the sense that rice production, although weak compared to demand, has driven most countries to invest in costly irrigation schemes, which have resulted in governments erecting barriers not only against extra-regional imports but also against West African imports. Given these protective measures, governments tend to discourage exports with the aim of maintaining enough supply of rice for urban centers. Policies that protect local rice and block its exports are incompatible with expanding regional rice trade.

These interventionist policies in the rice sub-sector, given the strategic role of rice, explain to a great extent why this sub-sector has generally been the last to be liberalized in the region. For example, the liberalization of this sub-sector started in Côte d'Ivoire and Senegal only in 1995 and 1996. Regional trade of rice has suffered from the fact that certain countries have liberalized their rice subsector very early (Gambia), while others are just starting the process (Burkina Faso).

Another element which impairs rice trade is institutional. In fact, the rules of ECOWAS do not classify rice among primary products, but among semi-processed goods, thus allowing different countries to impose taxes on imports from the sub-region or forbid imports from the regional markets when deemed necessary. As a result, tariff and non-tariff barriers are encouraged in the region.

5.2.3 Horticultural Products

Although studies on horticultural products are quite rare, it can be argued that the potential for trade has become extremely wide, given the strengthening of economic activities and income increases following the devaluation. This potential is nevertheless constrained by a local supply concentrated during a very short period of the year, which forces producers to sell their products while the prices are at their lowest. This supply is even more limited since producers, small farmers, lack modern technologies and adequate knowledge to improve production. The weakness of public investment in research aimed at improving productivity is a sign of the limited interest in horticultural products in most West African countries. This lack of interest is confirmed as well by the scarce agricultural data on production (yield and area) of fruits and vegetables in most of the countries.

The supply of these products must also confront the well-known problem of conservation in production zones, as well as in the consumer markets. The physical losses after harvest are generally quite high, about 50% for some products such as onions and tomatoes (Nicholson and Stathacos, 1992). The losses in the production areas usually stem from the lack of means of transport to the consumption areas. Moreover, vehicles are often not properly adapted to the sale of products since they do not have refrigerating apparatuses to avoid losses, especially when the trucks are being held by law enforcement officials. Without refrigeration, it might be wiser to direct research towards the processing procedures so as to avoid post-harvest losses.

5.2.4 Livestock

At a general level, Metzel (1995) - author of a study on the economic and financial situation of livestock - shows that the potential for regional trade of livestock is constrained by issues related to the supply of the products, and notably the availability of a forage biomass at low cost. The analysis of the use of forage resources in the different systems suggests that the maximum obtainable density is of about 9 UBT/km² in the semi-arid or rainy zones, 14 UBT/km² at the Niger delta, and 26 UBT/km² in Southern Mali. Several studies report that the current density are already at their maximum in the arid areas, and close to their maximum in the remaining areas¹. In the pure pastoral system where the density is only 3.9 UBT/km², the optimal number of livestock is already limited by feed and water constraints. In the contrary, the current density is less than one third of the capacity in the sub-humid zones.

A comparison of production techniques suggests that the most expansive and mobile systems of production are generally more efficient in cases of low density, but the possibility of expansion of these systems is quite limited. Efforts to promote the use of commercial feed and the intensive management of livestock in West Africa generate higher returns, but with higher unit costs per head. Therefore, the per head economic profit increases with intensification, but the daily return to labor decreases. Fattening in the small private farms generates positive economic profits, even if the marginal profit of additional resources is lower than that of production without fattening. For this reason, the fattening system on a low scale represents an attractive area of investment in order to increase meat production.

These hypotheses show that animal production should increase in the rainy areas and the Niger Delta, provided that integration between livestock and agriculture increases in the next years. This integration is affected by further constraints during certain periods of the year, such as the availability of labor during the beginning of the agricultural season when the demand for labor for field work is very high. At the same time the livestock subsector also needs labor to guide herds to find adequate biomass for feeding and to prevent herds from damaging cultivated fields as well. This simultaneous demand for labor suggests that following the intensification of livestock production,

¹ UBT is the unit of tropical livestock which corresponds to 250 kg.

labor will become a constraining factor at the end of the dry season and the beginning of the rainy one, resulting in an increase in the return to labor.

Another constraint which hinders the increase in livestock trade, although less significant than the one described above, is a result of the disparity of health control policies. Savadogo (1997) shows that Ghana has adopted a policy of quarantining livestock from Burkina Faso since the authorities consider the sanitary requirements in Burkina Faso unsatisfactory. Livestock exported from Burkina Faso subsequently loses weight resulting in a decrease of the financial profitability of exports, which discourages exports from Burkina Faso.

In conclusion, the potential for sub-regional trade is significant in West Africa, but numerous obstacles constrain its implementation. We can list general constraints which affect all of the agricultural sector. These include the inefficiency of regional organizations, the weakness of inputs markets, the lack of coordination between the agricultural market information systems, and high transport costs resulting from fiscal policies and abuses of law enforcement officials. Besides general obstacles, we can identify constraints that are specific to the different sub-sectors. All policies aimed at improving sub-regional trade need to address these obstacles, and in general, improve basic infrastructure to increase the efficiency of marketing agricultural products.

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APPENDIX

Results before Devaluation								
Producer	Importer			MAIZE	MAIZE	MIL/SOR	MIL/SOR	RICE
Mali	Senegal	FP (CFAF/kg)		Impr. Man.	Trad. Man.	Anim. Trac.	Trad. Man.	Intensive
			FARM					26.81
			NIONO					38.89
			BAMAKO					61.85
			KAYES					67.05
			TAMBA					36.06
			KAOLACK					11.78
			DAKAR					-20.99
		DRC	FARM					0.38
			NIONO					0.55
			BAMAKO					0.79
			KAYES					0.97
			TAMBA					1.26
			KAOLACK					1.45
			DAKAR					1.68
Mali	Cote d'Ivoire	FP (CFAF/kg)	FARM			-10.60	-30.47	95.53
			NIONO					25.88
			BAMAKO			-9.30	-29.17	78.84
			SIKASSO			-10.30	-30.17	97.30
			KORHOGO			20.70	-24.17	52.53
			BOUAKE			19.93	-19.94	76.76
			ABIDJAN			26.20	-8.67	114.18
		DRC	FARM			0.44	0.61	0.40
			NIONO					0.66
			BAMAKO			0.55	0.73	0.79
			SIKASSO			0.55	0.73	1.02
			KORHOGO			0.74	0.95	1.17
			BOUAKE			0.92	1.15	1.44
			ABIDJAN			1.47	1.74	2.40
Mali	Guinee	FP (CFAF/kg)	FARM	-54.40	-25.73	-10.60	-30.47	
			SIKASSO	-55.56	-26.89	-9.30	-29.17	
			BAMAKO	-43.56	-14.89	-10.30	-30.17	
		FP (GF/kg)	SIGUIRI	-151.44	-62.63	-123.61	-171.30	
		FP (GF/kg)	KANKAN	-141.44	-92.63	-118.61	-166.30	
		DRC	FARM	0.66	0.42	0.44	0.61	
			SIKASSO	0.80	0.52	0.55	0.73	
			BAMAKO	0.80	0.52	0.55	0.73	
			SIGUIRI	1.93	1.37	1.35	1.67	
			KANKAN	2.15	1.55	1.51	1.84	
Cote d'Ivoire	Mali	FP (CFAF/kg)	FARM	-55.09	-24.67			
			BOUAKE	-41.82	-11.40			
			ABIDJAN	-50.14	-19.72			
			KORHOGO	-55.42	-25.00			
			SIKASSO	-71.20	-40.78			
			BAMAKO	-58.20	-27.78			
		DRC	FARM	0.70	0.42			
			BOUAKE	0.92	0.58			
			ABIDJAN	1.56	1.04			
			KORHOGO	0.92	0.58			
			SIKASSO	0.92	0.58			
			BAMAKO	0.92	0.58			
Senegal	Mali	FP (CFAF/kg)	FARM					59.70
			MATHAM					43.20
			DAKAR					-19.24
			KAYES					48.26
			BAMAKO					25.85
		DRC	FARM					0.52
			MATHAM					1.14
			DAKAR					0.52
			KAYES					3.31
			BAMAKO					1.81
Guinee	Senegal	FP (GF/kg)	FARM	14.09	-18.50			
		FP (GF/kg)	LABE	13.19	-19.40			
		FP (GF/kg)	CONAKRY	54.69	22.10			
		FP (CFAF/kg)	TAMBA	60.79	47.21			
		FP (CFAF/kg)	KAOLACK	53.97	40.39			
		FP (CFAF/kg)	DAKAR	80.84	67.26			
		DRC	FARM	0.59	0.78			
			LABE	0.75	0.97			
			CONAKRY	1.62	1.96			
			TAMBA	1.23	1.52			
			KAOLACK	1.41	1.72			
			DAKAR	1.70	2.05			
Guinee	Mali	FP (GF/kg)	FARM					29.64
		FP (GF/kg)	KANKAN					16.62
		FP (GF/kg)	CONAKRY					-39.88
		FP (CFAF/kg)	BAMAKO					68.97
		FP (CFAF/kg)	KAYES					74.16
		DRC	FARM					0.66
			KANKAN					0.95
			CONAKRY					2.11
			BAMAKO					0.83
			KAYES					0.84

Results with a Change in Price

Producer	Importer			MAIZE Impr. Man.	MAIZE Trad. Man.	MIL/SOR Anim. Trac.	MIL/SOR Trad. Man.	RICE Intensive	RICE Semi-intens.
Mali	Senegal	FP (CFAF/kg)	FARM					96.19	100.01
			NIONO					26.55	30.36
			BAMAKO					79.50	83.32
			KAYES					69.70	73.52
			TAMBA					73.71	67.53
			KAOLACK					64.43	58.25
			DAKAR					66.67	60.49
		DRC	FARM					0.43	0.41
			NIONO					0.63	0.62
			BAMAKO					0.92	0.90
			KAYES					1.14	1.12
			TAMBA					1.54	1.52
			KAOLACK					1.81	1.78
			DAKAR					2.15	2.13
Mali	Cote d'Ivoire	FP (CFAF/kg)	FARM			-10.60	-30.47	96.19	100.01
			NIONO			na	na	26.55	0.36
			BAMAKO			8.16	-11.71	79.50	83.32
			SIKASSO			-1.34	-21.21	97.72	97.08
			KORHOGO			30.16	10.29	53.20	57.01
			BOUAKE			64.39	44.52	77.42	81.24
			ABIDJAN			55.66	35.79	114.85	118.66
		DRC	FARM			0.44	0.61	0.39	0.38
			NIONO			na	na	0.66	0.64
			BAMAKO			0.55	0.74	0.79	0.77
			SIKASSO			0.55	0.74	1.01	0.99
			KORHOGO			0.75	0.96	1.16	1.14
			BOUAKE			0.93	1.16	1.42	1.40
			ABIDJAN			1.49	1.76	2.37	2.35
Mali	Guinee	FP (CFAF/kg)	FARM	-64.98	-34.19	-10.60	-30.47		
			SIKASSO	-35.10	-4.31	8.16	-11.71		
			BAMAKO	-33.10	-2.31	-1.34	-21.21		
		FP (GF/kg)	SIGUIRI	-35.14	38.75	217.09	169.41		
		FP (GF/kg)	KANKAN	137.86	211.75	136.34	88.66		
			FARM	0.74	0.47	0.44	0.61		
		DRC	SIKASSO	0.92	0.60	0.55	0.74		
			BAMAKO	0.92	0.60	0.55	0.74		
			SIGUIRI	2.31	1.63	1.37	1.69		
			KANKAN	2.61	1.86	1.53	1.86		
			FARM	-26.61	6.19				
Cote d'Ivoire	Mali	FP (CFAF/kg)	BOUAKE	18.66	51.46				
			ABIDJAN	30.34	63.14				
			KORHOGO	-59.94	-27.14				
			SIKASSO	-51.72	-18.92				
			BAMAKO	-45.72	-12.92				
		DRC	FARM	0.78	0.47				
			BOUAKE	1.03	0.64				
			ABIDJAN	1.79	1.17				
			KORHOGO	1.03	0.64				
			SIKASSO	1.03	0.64				
			BAMAKO	1.03	0.64				
Senegal	Mali	FP (CFAF/kg)	FARM					53.79	
			MATHAM					62.31	
			DAKAR					59.81	
			KAYES					57.37	
			BAMAKO					49.95	
		DRC	FARM					0.56	
			MATHAM					1.23	
			DAKAR					3.82	
			KAYES					1.99	
			BAMAKO					1.99	
Guinee	Senegal	FP (GF/kg)	FARM	14.09	-18.50				
		FP (GF/kg)	LABE	353.19	320.60				
		FP (GF/kg)	CONAKRY	55.69	23.10				
		FP (CFAF/kg)	TAMBA	52.50	38.92				
		FP (CFAF/kg)	KAOLACK	53.90	40.32				
		FP (CFAF/kg)	DAKAR	67.30	53.72				
		DRC	FARM	0.59	0.78				
			LABE	0.75	0.97				
			CONAKRY	1.62	1.96				
			TAMBA	1.23	1.52				
			KAOLACK	1.41	1.72				
			DAKAR	1.70	2.05				
Guinee	Mali	FP (GF/kg)	FARM					29.64	
		FP (GF/kg)	KANKAN					379.62	
		FP (GF/kg)	CONAKRY					398.12	
		FP (CFAF/kg)	BAMAKO					98.97	
		FP (CFAF/kg)	KAYES					89.16	
		DRC	FARM					0.66	
			KANKAN					0.95	
			CONAKRY					2.11	
			BAMAKO					0.83	
			KAYES					0.84	

Results with a Change Yields

Producer	Importer			MAIZE Impr. Man.	MAIZE Trad. Man.	MIL/SOR Anim. Trac.	MIL/SOR Trad. Man.	RICE Intensive	RICE Semi-intens.
Mali	Senegal	FP (CFAF/kg)	FARM					57.21	62.43
			NIONO					69.23	74.44
			BAMAKO					92.19	97.40
			KAYES					97.39	102.60
			TAMBA					66.40	51.61
			KAOLACK					42.12	47.33
			DAKAR					9.36	44.56
		DRC	FARM					0.23	0.21
			NIONO					0.36	0.33
			BAMAKO					0.53	0.49
			KAYES					0.65	0.61
			TAMBA					0.82	0.77
			KAOLACK					0.93	0.88
			DAKAR					1.06	1.00
Mali	Cote d'Ivoire	FP (CFAF/kg)	FARM			-16.29	-37.90	57.21	62.43
			NIONO			na	na	69.23	44.44
			BAMAKO			-14.99	-36.60	92.19	97.40
			SIKASSO			-15.99	-37.60	98.40	100.05
			KORHOGO			15.01	-31.60	58.88	64.09
			BOUAKE			14.24	-27.37	73.11	78.32
			ABIDJAN			20.51	-16.10	68.53	73.74
		DRC	FARM			0.49	0.66	0.21	0.19
			NIONO			na	na	0.37	0.34
			BAMAKO			0.60	0.80	0.46	0.44
			SIKASSO			0.60	0.80	0.59	0.56
			KORHOGO			0.81	1.03	0.63	0.59
			BOUAKE			1.00	1.25	0.75	0.70
			ABIDJAN			1.60	1.88	1.11	1.04
Mali	Guinee	FP (CFAF/kg)	FARM	-54.40	-25.73	-16.29	-37.90		
			SIKASSO	-55.56	-26.89	2.47	-19.14		
			BAMAKO	-43.56	-14.89	-7.03	-28.64		
		FP (GF/kg)	SIGUIRI	-131.44	-62.63	203.44	151.57		
		FP (GF/kg)	KANKAN	-161.44	-92.63	122.44	70.57		
		DRC	FARM	0.66	0.42	0.49	0.66		
			SIKASSO	0.80	0.52	0.61	0.80		
			BAMAKO	0.80	0.52	0.61	0.80		
			SIGUIRI	1.93	1.37	1.48	1.82		
			KANKAN	2.15	1.55	1.66	2.01		
Cote d'Ivoire	Mali	FP (CFAF/kg)	FARM	-57.74	-26.37				
			BOUAKE	-44.47	-13.10				
			ABIDJAN	-52.78	-21.41				
			KORHOGO	-58.07	-26.70				
			SIKASSO	-73.84	-42.47				
			BAMAKO	-60.84	-29.47				
		DRC	FARM	0.73	0.44				
			BOUAKE	0.95	0.59				
			ABIDJAN	1.61	1.07				
			KORHOGO	0.95	0.59				
			SIKASSO	0.95	0.59				
			BAMAKO	0.95	0.59				
Senegal	Mali	FP (CFAF/kg)	FARM					59.70	
			MATHAM					43.20	
			DAKAR					-19.24	
			KAYES					48.26	
			BAMAKO					25.85	
		DRC	FARM					0.52	
			MATHAM					1.14	
			DAKAR					3.31	
			KAYES					1.81	
			BAMAKO					1.81	
Guinee	Senegal	FP (GF/kg)	FARM	14.09	-18.50				
		FP (GF/kg)	LABE	13.19	-19.40				
		FP (GF/kg)	CONAKRY	54.69	22.10				
		FP (CFAF/kg)	TAMBA	60.79	47.21				
		FP (CFAF/kg)	KAOLACK	53.97	41.02				
		FP (CFAF/kg)	DAKAR	80.84	67.26				
		DRC	FARM	0.59	0.78				
			LABE	0.75	0.97				
			CONAKRY	1.62	1.96				
			TAMBA	1.23	1.52				
			KAOLACK	1.41	1.72				
			DAKAR	1.70	2.05				
Guinee	Mali	FP (GF/kg)	FARM					29.64	
		FP (GF/kg)	KANKAN					16.62	
		FP (GF/kg)	CONAKRY					-39.88	
		FP (CFAF/kg)	BAMAKO					68.97	
		FP (CFAF/kg)	KAYES					74.16	
		DRC	FARM					0.66	
			KANKAN					0.95	
			CONAKRY					2.11	
			BAMAKO					0.83	
			KAYES					0.84	

Results with a Change in Transport Costs

Producer	Importer			MAIZE Impr. Man.	MAIZE Trad. Man.	MIL/SOR Anim. Trac.	MIL/SOR Trad. Man.	RICE Intensive	RICE Semi-intens.
Mali	Senegal	FP (CFAF/kg)	FARM					27.40	32.40
			NIONO					39.48	44.48
			BAMAKO					58.54	63.54
			KAYES					62.10	67.09
			TAMBA					29.74	14.74
			KAOLACK					4.52	9.52
			DAKAR					-28.85	6.15
			DRC					0.36	0.34
			FARM					0.51	0.49
			NIONO					0.78	0.75
			BAMAKO					0.99	0.95
			KAYES					1.34	1.40
			TAMBA					1.60	1.55
			KAOLACK					1.92	1.85
			DAKAR					28.91	32.40
			FARM			-10.60	-30.47	40.99	14.48
Mali	Cote d'Ivoire	FP (CFAF/kg)	NIONO			na	na	60.05	63.54
			BAMAKO			-9.30	-29.17	80.11	79.16
			SIKASSO			-13.30	-33.17	29.64	70.13
			KORHOGO			19.70	-25.17	43.86	47.35
			BOUAKE			18.93	-20.94	39.29	42.78
			ABIDJAN			25.20	-9.67	0.34	0.33
			DRC			0.44	0.60	0.55	0.54
			FARM			na	na	0.67	0.66
			NIONO			0.54	0.72	0.86	0.84
			BAMAKO			0.54	0.72	0.96	0.94
			SIKASSO			0.75	0.96	1.15	1.13
			KORHOGO			0.93	1.17	1.78	1.76
			BOUAKE			1.50	1.77		
			ABIDJAN						
			FARM	-54.40	-25.73	-10.60	-30.47		
			SIKASSO	-55.56	-26.89	-9.30	-29.17		
			BAMAKO	-46.56	-17.89	-13.30	-33.17		
Mali	Guinea	FP (GF/kg)	SIGUIRI	-143.64	-74.83	-135.81	-183.50		
			KANKAN	-178.64	-109.83	-135.81	-183.50		
			DRC						
			FARM	0.60	0.38	0.40	0.55		
		FP (GF/kg)	SIKASSO	0.72	0.47	0.49	0.66		
			BAMAKO	0.72	0.47	0.49	0.66		
			SIGUIRI	2.55	1.86	1.77	2.12		
			KANKAN	2.94	2.19	2.03	2.39		
		FP (CFAF/kg)	FARM	-55.09	-24.67				
			BOUAKE	-41.82	-11.40				
			ABIDJAN	-50.14	-19.72				
			KORHOGO	-63.11	-32.69				
		DRC	SIKASSO	-76.11	-45.69				
			BAMAKO	-65.11	-34.69				
			FARM	0.70	0.42				
			BOUAKE	0.92	0.58				
Cote d'Ivoire	Mali	FP (CFAF/kg)	ABIDJAN	1.56	1.04				
			KORHOGO	0.92	0.58				
			SIKASSO	0.92	0.58				
			BAMAKO	0.92	0.58				
		DRC	FARM						
			BOUAKE						
			ABIDJAN						
			KORHOGO						
		FP (GF/kg)	SIKASSO						
			BAMAKO						
			FARM						
			MATHAM						
		DRC	DAKAR						
			KAYES						
			BAMAKO						
			FARM						
Senegal	Mali	FP (CFAF/kg)	MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
		DRC	FARM						
			MATHAM						
			DAKAR						
			KAYES						
		FP (GF/kg)	BAMAKO						
			FARM						
			LABE						
			CONAKRY						
		FP (CFAF/kg)	TAMBA						
			KAOLACK						
			DAKAR						
			FARM						
Guinee	Senegal	FP (GF/kg)	LABE						
			CONAKRY						
			TAMBA						
			KAOLACK						
		FP (CFAF/kg)	DAKAR						
			FARM						
			LABE						
			CONAKRY						
		FP (CFAF/kg)	TAMBA						
			KAOLACK						
			DAKAR						
			FARM						
		DRC	KANKAN						
			CONAKRY						
			BAMAKO						
			KAYES						
Guinee	Mali	FP (GF/kg)	FARM						
			KANKAN						
			CONAKRY						
			BAMAKO						
		FP (CFAF/kg)	KAYES						
			FARM						
			KANKAN						
			CONAKRY						
		DRC	BAMAKO						
			KAYES						
			FARM						
			KANKAN						
		FP (CFAF/kg)	CONAKRY						
			BAMAKO						
			KAYES						
			FARM						

Results with a Change in Price and Yields

Producer	Importer			MAIZE	MAIZE	MIL/SOR	MIL/SOR	RICE	RICE
				Impr. Man.	Trad. Man.	Anim. Trac.	Trad. Man.	Intensive	Semi-intens.
Mali	Senegal	FP (CFAF/kg)	FARM					129.77	134.53
			NIONO					60.07	64.82
			BAMAKO					113.03	117.78
			KAYES					103.22	107.97
			TAMBA					227.24	101.98
			KAOLACK					32.95	97.70
			DAKAR					70.19	94.94
			DRC					0.25	0.23
		DRC	FARM					0.40	0.38
			NIONO					0.59	0.56
			BAMAKO					0.73	0.69
			KAYES					0.95	0.90
			TAMBA					1.09	1.03
			KAOLACK					1.25	1.19
			DAKAR					1.25	1.19
			FARM			-16.29	-37.90	129.77	134.53
Mali	Cote d'Ivoire	FP (CFAF/kg)	NIONO			na	na	60.07	34.82
			BAMAKO			2.47	-19.14	113.03	117.78
			SIKASSO			-7.03	-28.64	119.35	120.53
			KORHOGO			24.47	2.86	86.72	91.47
			BOUAKE			58.70	37.09	110.94	115.69
			ABIDJAN			49.97	28.36	148.37	153.12
			DRC			0.49	0.66	0.23	0.21
			FARM			na	na	0.41	0.39
		DRC	NIONO			0.61	0.80	0.52	0.49
			BAMAKO			0.61	0.80	0.66	0.63
			SIKASSO			0.81	1.04	0.72	0.68
			KORHOGO			1.01	1.26	0.86	0.81
			BOUAKE			1.63	1.91	1.33	1.25
			ABIDJAN			1.63	1.91	1.33	1.25
Mali	Guinee	FP (CFAF/kg)	FARM	-64.98	-34.19	-16.29	-37.90		
			SIKASSO	-35.10	-4.31	2.47	-19.14		
			BAMAKO	-33.10	-2.31	-7.03	-28.64		
			SIGUIRI	-35.14	38.75	203.44	151.57		
			KANKAN	137.86	211.75	122.69	70.82		
			FARM	0.74	0.47	0.49	0.66		
			SIKASSO	0.92	0.60	0.61	0.80		
			BAMAKO	0.92	0.60	0.61	0.80		
		DRC	SIGUIRI	2.31	1.63	1.48	1.82		
			KANKAN	2.61	1.86	1.66	2.01		
			FARM	-29.55	4.27				
			BOUAKE	15.72	49.54				
			ABIDJAN	27.40	61.23				
			KORHOGO	-62.88	-29.06				
			SIKASSO	-54.66	-20.83				
			BAMAKO	-48.66	-14.83				
Cote d'Ivoire	Mali	FP (CFAF/kg)	FARM	0.81	0.48				
			BOUAKE	1.07	0.66				
			ABIDJAN	1.86	1.20				
			KORHOGO	1.07	0.66				
			SIKASSO	1.07	0.66				
			BAMAKO	1.07	0.66				
		DRC	FARM					53.79	
			MATHAM					62.31	
			DAKAR					59.81	
			KAYES					57.37	
			BAMAKO					49.95	
			FARM					0.56	
			MATHAM					1.23	
			DAKAR					3.82	
			KAYES					1.99	
Senegal	Mali	FP (CFAF/kg)	BAMAKO					1.99	
			FARM						
			MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
			FARM						
			MATHAM						
		DRC	DAKAR						
			KAYES						
			BAMAKO						
			FARM						
			MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
Guinee	Senegal	FP (GF/kg)	FARM	14.09	-18.50				
			LABE	13.19	-19.40				
			CONAKRY	54.69	22.10				
			TAMBA	147.50	133.92				
			KAOLACK	137.90	124.32				
			DAKAR	138.30	124.72				
			FARM	0.59	0.78				
			LABE	0.75	0.97				
		DRC	CONAKRY	1.62	1.96				
			TAMBA	1.23	1.52				
			KAOLACK	1.41	1.72				
			DAKAR	1.70	2.05				
			FARM					29.64	
			KANKAN					379.62	
			CONAKRY					398.12	
			BAMAKO					98.97	
			KAYES					86.94	
Guinee	Mali	FP (GF/kg)	FARM					0.66	
			KANKAN					0.95	
			CONAKRY					2.11	
			BAMAKO					0.81	
			KAYES					0.82	
			FARM						
			KANKAN						
			CONAKRY						
		DRC	BAMAKO						
			KAYES						
			FARM						
			KANKAN						
			CONAKRY						
			BAMAKO						
			KAYES						
			FARM						

Results with Change in Price and Transport Costs

Producer	Importer			MAIZE	MAIZE	MIL/SOR	MIL/SOR	RICE	RICE
				Impr. Man.	Trad. Man.	Anim. Trac.	Trad. Man.	Intensive	Semi-intens.
Mali	Senegal	FP (CFAF/kg)	FARM					96.19	100.01
			NIONO					26.55	30.36
			BAMAKO					79.50	79.42
			KAYES					69.70	67.98
			TAMBA					193.71	61.46
			KAOLACK					-0.57	52.17
			DAKAR					36.67	52.03
			DRC					0.43	0.39
			NIONO					0.63	0.57
			BAMAKO					0.92	0.89
			KAYES					1.14	1.16
			TAMBA					1.54	1.76
			KAOLACK					1.81	1.95
			DAKAR					2.15	2.51
		FP (CFAF/kg)	FARM			-10.60	-454.51	96.19	100.01
			NIONO			na	na	26.55	0.36
			BAMAKO			8.16	-435.75	75.61	79.42
			SIKASSO			-4.34	-448.25	95.83	95.18
			KORHOGO			29.16	-414.75	52.20	56.01
			BOUAKE			63.39	-380.53	76.42	80.24
			ABIDJAN			54.66	-389.25	113.85	117.66
			DRC			0.44	4.49	0.39	0.37
Mali	Cote d'Ivoire	FP (CFAF/kg)	FARM					0.65	0.63
			NIONO					0.79	0.77
			BAMAKO			0.55	5.47	1.02	1.00
			SIKASSO			0.55	5.47	1.18	1.16
			KORHOGO			0.76	7.44	1.45	1.42
			BOUAKE			0.94	9.57	2.42	2.40
			ABIDJAN			1.52	18.64		
			DRC						
		FP (GF/kg)	FARM	-64.98	-34.19	-10.60	-30.47		
			SIKASSO	-35.10	-4.31	8.16	-11.71		
			BAMAKO	-36.10	-5.31	-4.34	-24.21		
			SIGUIRI	-47.34	26.55	204.89	157.21		
			KANKAN	120.66	194.55	119.14	71.46		
			FARM	0.67	0.42	0.40	0.55		
			SIKASSO	0.82	0.53	0.50	0.66		
			BAMAKO	0.82	0.53	0.50	0.66		
Cote d'Ivoire	Mali	FP (GF/kg)	SIGUIRI	3.19	2.29	1.79	2.14		
			KANKAN	3.76	2.76	2.07	2.42		
			FARM	-26.61	6.19				
			BOUAKE	18.66	51.46				
			ABIDJAN	30.34	63.14				
			KORHOGO	-67.63	-34.83				
			SIKASSO	-56.63	-23.83				
			BAMAKO	-52.63	-19.83				
		DRC	FARM	0.78	0.47				
			BOUAKE	1.03	0.64				
			ABIDJAN	1.79	1.17				
			KORHOGO	1.03	0.64				
			SIKASSO	1.03	0.64				
			BAMAKO	1.03	0.64				
			FARM					59.70	
			MATHAM					68.20	
Senegal	Mali	FP (CFAF/kg)	DAKAR					65.76	
			KAYES					63.26	
			BAMAKO					55.85	
			FARM					0.52	
			MATHAM					1.14	
			DAKAR					3.31	
			KAYES					1.81	
			BAMAKO					1.81	
		DRC	FARM						
			MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
			FARM						
			MATHAM						
			DAKAR						
Guinea	Senegal	FP (GF/kg)	KAYES						
			BAMAKO						
			FARM						
			MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
			FARM						
		DRC	MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
			FARM						
			MATHAM						
			DAKAR						
			KAYES						
Guinea	Mali	FP (GF/kg)	BAMAKO						
			FARM						
			MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
			FARM						
			MATHAM						
		DRC	DAKAR						
			KAYES						
			BAMAKO						
			FARM						
			MATHAM						
			DAKAR						
			KAYES						
			BAMAKO						
Guinea	Mali	FP (GF/kg)	FARM	14.09	-18.50				
			LABE	13.19	-19.40				
			CONAKRY	54.69	22.10				
			TAMBA	147.50	133.92				
			KAOLACK	137.90	124.32				
			DAKAR	138.30	124.72				
			FARM	0.59	0.78				
			LABE	0.75	0.97				
		DRC	CONAKRY	1.62	1.96				
			TAMBA	1.20	1.49				
			KAOLACK	1.40	1.71				
			DAKAR	1.70	2.05				
			FARM					29.64	
			KANKAN					379.62	
			CONAKRY					398.12	
			BAMAKO					98.97	
			KAYES					86.94	
			FARM					0.66	
			KANKAN					0.95	
			CONAKRY					2.11	
			BAMAKO					0.81	
			KAYES					0.82	

Results with a Change in Price, Transport Costs and Yields

Producer	Importer			MAIZE	MAIZE	MIL/SOR	MIL/SOR	RICE	RICE
				Impr. Man.	Trad. Man.	Anim. Trac.	Trad. Man.	Intensive	Semi-intens.
Mali	Senegal	FP (CFAF/kg)	FARM					129.77	134.53
			NIONO					60.07	64.82
			BAMAKO					109.13	113.88
			KAYES					97.69	102.43
			TAMBA					220.33	95.91
			KAOLACK					25.11	91.63
			DAKAR					61.74	86.49
			DRC					0.24	0.22
		DRC	FARM					0.37	0.35
			NIONO					0.59	0.56
			BAMAKO					0.75	0.72
			KAYES					1.02	1.02
			TAMBA					1.21	1.12
			KAOLACK					1.44	1.36
			DAKAR						
			FARM					129.77	134.53
Mali	Cote d'Ivoire	FP (CFAF/kg)	NIONO			na	na	60.07	34.82
			BAMAKO			2.47	-19.14	109.13	113.88
			SIKASSO			-10.03	-31.64	117.45	118.64
			KORHOGO			23.47	1.86	85.72	90.47
			BOUAKE			57.70	36.09	109.94	114.69
			ABIDJAN			48.97	27.36	147.37	152.12
			DRC			0.48	0.66	0.23	0.21
			FARM					0.41	0.38
		DRC	NIONO		na		na	0.52	0.49
			BAMAKO			0.60	0.79	0.67	0.64
			SIKASSO			0.60	0.79	0.73	0.69
			KORHOGO			0.82	1.05	0.87	0.83
			BOUAKE			1.03	1.28	1.35	1.28
			ABIDJAN			1.66	1.94		
Mali	Guinee	FP (CFAF/kg)	FARM	-64.98	-34.19	-16.29	-37.90		
			SIKASSO	-35.10	-4.31	2.47	-19.14		
			BAMAKO	-36.10	-5.31	-10.03	-31.64		
			SIGUIRI	-47.34	26.55	191.24	139.37		
		FP (GF/kg)	KANKAN	120.66	194.55	105.49	53.62		
			FARM	0.67	0.42	0.44	0.60		
			SIKASSO	0.82	0.53	0.54	0.72		
			BAMAKO	0.82	0.53	0.54	0.72		
		DRC	SIGUIRI	3.19	2.29	1.95	2.32		
			KANKAN	3.76	2.76	2.25	2.61		
			FARM	-29.55	4.27				
		DRC	BOUAKE	15.72	49.54				
			ABIDJAN	27.40	61.23				
			KORHOGO	-70.57	-36.74				
			SIKASSO	-59.57	-25.74				
			BAMAKO	-55.57	-21.74				
			FARM	0.81	0.48				
			BOUAKE	1.07	0.66				
			ABIDJAN	1.86	1.20				
Cote d'Ivoire	Mali	FP (CFAF/kg)	KORHOGO	1.07	0.66				
			SIKASSO	1.07	0.66				
			BAMAKO	1.07	0.66				
			FARM					59.70	
		DRC	MATHAM					68.20	
			DAKAR					59.70	
			KAYES					65.76	
			BAMAKO					63.26	
			FARM					0.52	
			MATHAM					1.14	
			DAKAR					0.52	
			KAYES					3.31	
			BAMAKO					63.26	
Senegal	Mali	FP (GF/kg)	FARM	14.09	-18.50				
			LABE	13.19	320.60				
			CONAKRY	54.69	23.10				
			TAMBA	147.50	38.92				
		FP (CFAF/kg)	KAOLACK	137.90	40.32				
			DAKAR	138.30	53.72				
			FARM	0.59	0.78				
			LABE	0.75	0.97				
		DRC	CONAKRY	1.62	1.96				
			TAMBA	1.20	1.49				
			KAOLACK	1.40	1.71				
			DAKAR	138.30	2.05				
Guinee	Senegal	FP (GF/kg)	FARM					29.64	
			KANKAN					379.62	
			CONAKRY					398.12	
			BAMAKO					98.97	
		FP (CFAF/kg)	KAYES					86.94	
			FARM					0.66	
			KANKAN					0.95	
			CONAKRY					2.11	
		DRC	BAMAKO					0.81	
			KAYES					0.82	

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